

Data Evaluation Report on the Acute Toxicity of BAS 183 WB H (Dicamba acid) to Algae (*Pseudokirchneriella subcapitata*)

PMRA Submission Number {.....}

EPA MRID Number 48718009

Data Requirement:

PMRA DATA CODE	{.....}
EPA DP Barcode	402518
OECD Data Point	{.....}
EPA MRID	48718009
EPA Guideline	850.4500

Test material: BAS 183 WB H

Purity: 48.41%

Common name Dicamba acid

Chemical name: IUPAC

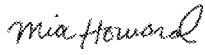
CAS name:

N,N-bis(3-aminopropyl)methylamine

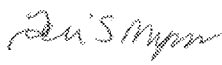
CAS No.: 105-83-9 (ai)

Synonyms: BAS 183 H LVF, BAAS 183 22 H, BAPMA Dicamba Salt

Primary Reviewer: Mia Howard
Environmental Scientist, CDM Smith

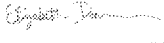
Signature: 
Date: 1/24/13

Secondary Reviewer: Teri S. Myers
Environmental Scientist, CDM Smith

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Date: 1/25/13

Primary Reviewer: Elizabeth Donovan, Biologist
EPA/EFED/ERB 6

Date: 9/7/2016


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Date: 2016.11.09 07:09:42 -05'00'

Reference/Submission No.: {.....}

Company Code {.....} [For PMRA]
Active Code {.....} [For PMRA]
Use Site Category: {.....} [For PMRA]
EPA PC Code 100094

Date Evaluation Completed: 11-3-2016

CITATION: Swierkot, A. 2011. BAS 183 WB H –*Pseudokirchneriella subcapitata* SAG 61.81. Growth Inhibition Test. Study performed by the Department of Ecotoxicology in Institute of Industrial Organic Chemistry, Pszczyna, Poland. Study identification numbers W/06/11, 395300, and 1 99 20 79. Study sponsored by BASF Corporation. Study completed 01 July 2011.

DISCLAIMER: This document provides guidance for EPA and PMRA reviewers on how to complete a data evaluation record after reviewing a scientific study concerning the acute toxicity of a pesticide to aquatic nonvascular plants. It is not intended to prescribe conditions to any external party for conducting this study nor to establish absolute criteria regarding the assessment of whether the study is scientifically sound and whether the study satisfies any applicable data requirements. Reviewers are expected to review and to determine for each study, on a case-by-case basis, whether it is scientifically sound and provides sufficient information to satisfy applicable data requirements. Studies that fail to meet any of the conditions may be accepted, if appropriate; similarly, studies that meet all of the conditions may be rejected, if appropriate. In sum, the reviewer is to take into account the totality of

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factors related to the test methodology and results in determining the acceptability of the study.

EXECUTIVE SUMMARY:

In a 72-hour acute toxicity study, cultures of freshwater green alga (*Pseudokirchneriella subcapitata* SAG 61.81) were exposed to BAS 183 WB H at nominal formulation concentrations of 0 (negative control), 0.41, 1.23, 3.70, 11.11, 33.33, and 100.0 mg/L under static conditions. Nominal active ingredient concentrations were 0 (negative control), 0.2, 0.6, 1.79, 5.38, 16.14, and 48.41 mg ai/L. Mean measured formulation concentrations were <LOD (negative control), 0.35, 1.05, 3.45, 10.71, 32.18, and 94.02 mg/L. Mean measured active ingredient concentrations were <LOD (negative control), 0.17, 0.51, 1.67, 5.19, 15.58, and 45.52 mg ai/L. The NOAEC, EC₀₅, and EC₅₀/IC₅₀ values based on growth rate were <0.35, 15.1, and 88.8 mg/L, respectively in terms of mean measured formulation concentrations. The NOAEC, EC₀₅, and EC₅₀/IC₅₀ values based on yield were <0.35, 0.825, and 14.9 mg/L, respectively in terms of mean measured formulation concentrations. The % growth inhibition of growth rate in the treated algal culture as compared to the control ranged from 2.6 to 54.6% . The % growth inhibition of yield in the treated algal culture as compared to the control ranged from 11.4 to 92.8%.

Cells exposed to mean measured formulation concentrations ≥ 1.05 mg/L appeared enlarged relative to those in the negative control group.

This toxicity study is classified as scientifically sound and does satisfy the guideline requirement for a freshwater alga (*Pseudokirchneriella subcapitata*) toxicity study.

Results Synopsis

Test Organism: Freshwater green alga, *Pseudokirchneriella subcapitata* SAG 61.81

Test Type (Flow-through, Static, Static Renewal): Static

Results in terms of mean measured formulation concentrations

Growth rate

EC₀₅: 15.1 mg/L 95% C.I.: 9.85 to 19.4 mg/L

EC₅₀: 88.8 mg/L 95% C.I.: 81.4 to 97 mg/L

NOAEC: <0.35 mg/L

Probit Slope: N/A

Yield (of cell density)

EC₀₅: 0.825 mg/L 95% C.I.: N/A to 1.9 mg/L

EC₅₀: 14.9 mg/L 95% C.I.: 10.9 to 20.3 mg/L

NOAEC: <0.35 mg/L

Probit Slope: N/A

Results in terms of mean measured active ingredient (dicamba) concentrations

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Growth rate

EC₀₅: 7.27 mg ai/L 95% C.I.: 4.74 to 9.34 mg ai/L
EC₅₀: 42.75 mg ai/L 95% C.I.: 39.19 to 46.70 mg ai/L
NOAEC: <0.17 mg ai/L
Probit Slope: N/A

Yield (of cell density)

EC₀₅: 0.40 mg ai/L 95% C.I.: N/A to 0.91 mg ai/L
EC₅₀: 7.17 mg ai/L 95% C.I.: 5.25 to 9.77 mg ai/L
NOAEC: <0.17 mg ai/L
Probit Slope: N/A

Results in terms of mean measured acid equivalent concentrations

Growth rate

EC₀₅: 7.10 mg ae /L 95% C.I.: 4.63 to 9.13 mg ae /L
EC₅₀: 41.77 mg ae /L 95% C.I.: 38.29 to 45.63 mg ae /L
NOAEC: <0.17 mg ae /L
Probit Slope: N/A

Yield (of cell density)

EC₀₅: 0.39mg ae/L 95% C.I.: N/A to 0.90 mg ae /L
EC₅₀: 7.01 mg ae /L 95% C.I.: 5.12 to 9.54 mg ae /L
NOAEC: <0.17 mg ae /L
Probit Slope: N/A

Endpoint(s) Effected: Growth rate and yield

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I. MATERIALS AND METHODS

- GUIDELINE FOLLOWED:** The study was conducted according the OECD Guidelines for Testing of Chemicals No 201 (2006). The following deviations from the US EPA OCSPP 850.4500 (2012) guideline are noted:
1. The duration of the test was only 72 hours. A test duration of at least 96 hours is required.
 2. Only 3 replicates were used per treatment level (and 6 for the control). A minimum of 4 replicates per level is required.
 3. The pH and total organic carbon, particulate matter, chlorine, pesticides, and metals concentrations of the dilution water were not reported.
 4. The shaking speed of the test vessels was not reported. It is recommended that *P. subcapitata* cultures are shaken at 100 oscillations per minute.
 5. The test range of test concentrations did not extend low enough to determine a NOAEC. However, EC5 values were calculable.

These deviations do affect the validity of the study.

COMPLIANCE: Signed and dated GLP, Quality Assurance and No Data Confidentiality statements were provided. The study was conducted in accordance with the GLP standards of the US EPA (40 CFR Part 160) with the following exception: the study was performed in Institute of Industrial Organic Chemistry, Branch Pszezyna, Department of Ecotoxicology, which owns State of GLP Compliance 4/2009/DPL issued on 17 June 1009 by Polish Bureau for Chemical Substances and Preparations, valid until 22 June 2011 and Statement of GLP Compliance Registration number 6/2011/GLP issued on 13 June 2011 by Polish Bureau for Chemical Substances.

A. MATERIALS:

1. Test material BAS 183 WB H

Description: Described as a liquid "of specific color and specific odor"

Lot No./Batch No. : 1732-10

Purity: 48.41%

Stability of compound under test conditions: Stable. At test initiation, measured concentrations ranged from 90.00 to 94.80% of nominal. At test termination, measured concentrations ranged from 80.00 to 99.07% of nominal.

(OECD recommends water solubility, stability in water and light, pKa, Pow, and vapor pressure of test compound)

Storage conditions of test chemicals: Room temperature in dry conditions in a tightly sealed container without exposure to light

Physicochemical properties of BAS 183 WB H.

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Parameter	Values	Comments
Water solubility at 20EC	6.6 g/L	at pH 1.8
Vapor pressure	1.67 mPa	at 25°C
UV absorption	Not reported	
pKa	Not reported	
Kow	Not reported	

2. Test organism:

Name: Freshwater green alga, *Pseudokirchneriella subcapitata* (Reinsch)
Korshikov

EPA requires a nonvascular species: For tier I testing, only one species, S. capricornutum, to be tested; for tier II testing, S. costatum, A. flos-aquae, S. capricornutum, and a freshwater diatom is tested.

OECD suggests the following species are considered suitable: S. capricornutum, S. subspicatus, and C. vulgaris. If other species are used, the strain should be reported

Strain: SAG 61.81
Source: In-house cultures originally obtained from The Algae Collection of
Göttingen University, Germany
Age of inoculum: 4 days
Method of cultivation: Cultured in AAP medium

B. STUDY DESIGN:

1. Experimental Conditions

a. Range-finding study: Two preliminary range-finding tests were performed. In the first range-finding test, the concentrations 0.1, 1.0, 10.0, and 100.0 mg/L were tested. Inhibition of cell density relative to the negative control was 3.2, 23.3, 49.11 and 89.7% for the 0.1, 1.0, 10.0, and 100.0 mg/L test concentrations, respectively. In the second range-finding test, the concentrations 0.41, 1.23, 3.70, 11.11, 33.33 and 100.0 mg/L were tested. Inhibition of cell density relative to the negative control was 4.6, 24, 28, 48.3, 65.4, and 89.4% for the 0.41, 1.23, 3.70, 11.11, 33.33 and 100.0 mg/L concentrations, respectively. The concentrations used in the second range-finding test were used in the definitive test.

b. Definitive Study

Table 1: Experimental Parameters

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Parameter	Details	Remarks
		Criteria
Acclimation period:	Continuously cultured in-house	<p><i>EPA recommends two week acclimation period.</i></p> <p><i>OECD recommends an amount of algae suitable for the inoculation of test cultures and incubated under the conditions of the test and used when still exponentially growing, normally after an incubation period of about 3 days. When the algal cultures contain deformed or abnormal cells, they must be discarded.</i></p>
Culturing media and conditions: (same as test or not)	Same as test	
Health: (any mortality observed)	None reported	
<u>Test system</u> Static/static renewal	Static	<p><i>EPA expects the test concentrations to be renewed every 3 to 4 days (one renewal for the 7 day test, 3-4 renewals for the 14 day test).</i></p>
Renewal rate for static renewal	N/A	
Incubation facility	Thermostatic chamber, ILW400STD, Pol-Eko-Aparatura, Poland	
Duration of the test	72 hours	<p><i>EPA requires: 96-120 hours</i></p> <p><i>OECD: 72 hours</i></p>
<u>Test vessel</u> Material: (glass/stainless steel) Size: Fill volume:	Glass 250 mL 100 mL	<p><i>OECD recommends 250 ml conical flasks are suitable when the volume of the test solution is 100 ml or use a culturing apparatus.</i></p>
<u>Details of AAP medium</u>		

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Parameter	Details	Remarks
		Criteria
pH at test initiation: pH at test termination: Chelator used: Carbon source: Salinity (for marine algae):	7.43 to 7.56 7.58 to 7.89 Na ₂ EDTAx2H ₂ O NaHCO ₃ N/A	<p>OECD recommends the medium pH after equilibration with air is ~8 with less than .001 mmol/l of chelator if used.</p> <p>EPA recommends 20X-AAP and chelating agents (e.g. EDTA) in the nutrient medium for optimum cell growth. Lower concentrations of chelating agents (down to one-third of the normal concentration recommended for AAP medium) may be used in the nutrient medium used for test solution preparation if it is suspected that the chelator will interact with the test material. ASTM reference, E1415-91 and D 3978-80 (reapproved 1987).</p>
If non-standard nutrient medium was used, detailed composition provided (Yes/No)	A standard medium was used and a detailed composition was also provided	
<u>Dilution water</u> source/type: pH: salinity (for marine algae): water pretreatment (if any): Total Organic Carbon: particulate matter: metals: pesticides: chlorine:	Deionized water Not reported N/A Filtered (SolPure7) Not reported Not reported Not reported Not reported Not reported	<p>EPA pH: <i>Skeletonema costatum</i> = ~8.0 Others = ~7.5 from beginning to end of the test. EPA salinity: 30-35 ppt. EPA is against the use of dechlorinated water.</p> <p>OECD: pH is measured at beginning of the test and at 72 hours, it should not normally deviate by more than one unit during the test.</p>
Indicate how the test material is added to the medium (added directly or used stock solution)	Used a 1.0 mg/mL stock solution prepared in AAP medium	
Aeration or agitation	Continuously shaken with a mechanical shaker (rate not specified)	

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Parameter	Details	Remarks
		Criteria
Initial cells density	10,000 cells/mL	<p>EPA requires an initial number of 3,000 - 10,000 cells/mL. For <i>Anabaena flos-aquae</i>, cell counts on day 2 are not required.</p> <p>OECD recommends that the initial cell concentration be approximately 10,000 cells/ml for <i>S. capricornutum</i> and <i>S. subspicatus</i>. When other species are used the biomass should be comparable.</p>
<u>Number of replicates</u> Control: Solvent control: Treatments:	6 N/A 3	<p>EPA requires a negative and/or solvent control with 3 or more replicates per doses. <i>Navicula</i> sp. tests should be conducted with four replicate.</p> <p>OECD preferably three replicates at each test concentration and ideally twice that number of controls. When a vehicle is used to solubilize the test substance, additional controls containing the vehicle at the highest concentration used in the test.</p>
<u>Test concentrations</u> Nominal (formulation): Nominal (active ingredient): Mean measured (formulation): Mean measured (active ingredient):	0 (negative control), 0.41, 1.23, 3.7, 11.11, 33.33, and 100 mg/L 0 (negative control), 0.2, 0.6, 1.79, 5.38, 16.14, and 48.41 mg ai/L <LOD (negative control), 0.35, 1.05, 3.45, 10.71, 32.18, and 94.02 mg/L <LOD (negative control), 0.17, 0.51, 1.67, 5.19, 15.58, and 45.52 mg ai/L	<p>The mean measured active ingredient concentrations were calculated by the reviewer as the arithmetic mean of the measured concentrations at 0 and 72 hours. The mean measured formulation concentrations were calculated by the reviewer by converting the active ingredient concentrations using the 48.41% purity value.</p> <p>LOD for the active ingredient was 0.005 mg/L</p>

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Parameter	Details	Remarks
		<i>Criteria</i>
		<p><i>EPA requires at least 5 test concentrations, with each at least 60% of the next higher one.</i></p> <p><i>OECD recommends at least five concentrations arranged in a geometric series, with the lowest concentration tested should have no observed effect on the growth of the algae. The highest concentration tested should inhibit growth by at least 50% relatively to the control and, preferably, stop growth completely.</i></p>
Solvent (type, percentage, if used)	N/A	
Method and interval of analytical verification	The concentrations of the test solutions were measured at 0 and 72 hours using liquid chromatography with UV-VIS detection	
<u>Test conditions</u> Temperature: Photoperiod: Light intensity and quality:	21.3 to 21.9°C Continuous 7733 to 7830 lux fluorescent light	<p><i>EPA temperature: <u>Skeletonema</u>: 20EC, Others: 24-25EC; EPA photoperiod: <i>S. costatum</i> 14 hr light/ 10 hr dark, Others: Continuous; EPA light: <i>Anabaena</i>: 2.0 Klux (±15%), Others: 4 - 5 Klux (±15%)</i></p> <p><i>OECD recommended the temperature in the range of 21 to 25°C maintained at ± 2°C and continuous uniform illumination provided at approximately 8000 Lux measured with a spherical collector.</i></p>
<u>Reference chemical (if used)</u> name: concentrations:	3,5 dichlorophenol 6 concentrations ranging 0.56 to 10 mg/L	<p>The reference substance was tested 26-29 January 2011. Each test level was tested in triplicate and the control was tested with 6 replicates. The EC50 values were 2.27 mg/L (72-hour growth rate) and 1.04 mg/L (72-hour yield)</p>

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Parameter	Details	Remarks
		Criteria
Other parameters, if any	N/A	

2. Observations:

Table 2: Observation parameters

Parameters	Details	Remarks
		Criteria
Parameters measured including the growth inhibition/other toxicity symptoms	Cell density Growth rate Yield	<i>EPA recommends the growth of the algae expressed as the cell count per mL, biomass per volume, or degree of growth as determined by spectrophotometric means.</i>
Measurement technique for cell density and other end points	The cell density was determined using the absorbance of the algal suspension at wavelength 670 nm and recalculated to cell numbers based on a nomogram. The nomogram is the regression curve of algae cell numbers versus measured absorbance and is based on the results of counting algae cells in the Bürker chamber by microscopic observations. The growth rate was calculated based on cell density using a logarithmic equation. Yield was calculated as final minus initial cell density.	<i>EPA recommends the measurement technique of cell counts or chlorophyll a</i> <i>OECD recommends the electronic particle counter, microscope with counting chamber, fluorimeter, spectrophotometer, and colorimeter. (note: in order to provide useful measurements at low cell concentrations when using a spectrophotometer, it may be necessary to use cuvettes with a light path of at least 4 cm).</i>
Observation intervals	24, 48, and 72 hours	<i>EPA and OECD: every 24 hours.</i>
Other observations, if any	Cells were observed microscopically for abnormalities	
	The biomass of the control	

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Parameters	Details	Remarks
		Criteria
Indicate whether there was an exponential growth in the control	increased by a factor of 97.6 after 96 hours. The OCSPP 850.4500 guideline requires that the cell density of the control increase by a factor of at least 100 after 96 hours, but does not provide a 72-hour recommendation.	<p><i>EPA requires control cell count at termination to be 2X initial count or by a factor of at least 16 during the test.</i></p> <p><i>OECD: cell concentration in control cultures should have increased by a factor of at least 16 within three days.</i></p>
Were raw data included?	Yes	

II. RESULTS and DISCUSSION:

A. INHIBITORY EFFECTS:

After 72 hours, the cell density of the negative control was 0.976×10^6 cells/mL, yielding inhibitions of 11.3, 23.9, 36.1, 42.4, 57.3, and 91.8% compared to the negative control for nominal formulation concentrations of 0.41, 1.23, 3.7, 11.11, 33.33, and 100 mg/L, respectively. The study author did not report toxicity values based on cell density.

After 72 hours, the mean growth rate of the negative control was 1.527, yielding inhibitions of 2.6, 6.0, 9.8, 12.1, 18.6, and 54.6% for nominal formulation concentrations of 0.41, 1.23, 3.7, 11.11, 33.33, and 100 mg/L, respectively. The NOAEC and EC50 values calculated by the study author based on growth rate were <0.41 and 11.59 mg/L, respectively, based on nominal formulation concentrations.

After 72 hours, the mean yield in the negative control was 0.966×10^6 cells/mL, yielding inhibitions of 11.4, 24.1, 36.4, 42.9, 57.9, and 92.8% for nominal formulation concentrations of 0.41, 1.23, 3.7, 11.11, 33.33, and 100 mg/L, respectively. The NOAEC and EC50 values calculated by the study author based on yield were <0.41 and 11.10 mg/L, respectively, based on nominal formulation concentrations.

Cells in the nominal 1.23, 3.70, 11.11, 33.33, and 100.0 mg/L groups were observed to be larger than algae in the control group. There was not a major change in pH during the test.

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Table 3: Effect of BAS 183 WB H on algal growth (freshwater green alga, *Pseudokirchneriella subcapitata*)

Treatment Nominal formulation (mean measured formulation) [Nominal active ingredient] {mean measured active ingredient} mg/L	Initial cell density (x10 ⁶ cells/mL)	Cell density (x10 ⁶ cells/mL) at			
		24 hours	48 hours	96 hours	
				cell count	% inhibition*
Negative control	0.01	0.039	0.226	0.976	--
0.41 (0.35) [0.20] {0.17}	0.01	0.035	0.200	0.866	11.3
1.23 (1.05) [0.6] {0.51}	0.01	0.030	0.173	0.743	23.9
3.7 (3.45) [1.79] {1.67}	0.01	0.030	0.155	0.624	36.1
11.11 (10.71) [5.38] {5.19}	0.01	0.030	0.151	0.562	42.4
33.33 (32.18) [16.14] {15.58}	0.01	0.016	0.103	0.417	57.3
100 (94.02) [48.81] {45.52}	0.01	0.009	0.030	0.080	91.8
Reference chemical (3,5 dichlorophenol) ¹	0.01 ^a				Not calculated
Nominal concentrations (mg/L)					
Negative control		0.063	0.242	1.375	
0.56		0.051	0.205	1.149	
1.0		0.053	0.170	0.805	
1.8		0.041	0.088	0.127	
3.2		0.028	0.038	0.036	
5.6		0.021	0.035	0.029	
10		0.024	0.031	0.031	

*The % inhibition values relative to the negative control were calculated by the reviewer using the mean cell density values for each test level

¹The reference test was performed 26-29 January 2011

^aThe initial cell density used in the reference tests was not reported, but is presumably the same as in the definitive test.

Table 4: Effect of BAS 183 WB H on algal growth (freshwater green alga, *Pseudokirchneriella subcapitata*)

Treatment Nominal formulation (mean	Initial cell density	Mean growth rate	Mean yield (based on cell density; x10 ⁶ cells/mL)
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measured formulation) [Nominal active ingredient] {mean measured active ingredient} mg/L	(x10 ⁶ cells/mL)	0-72 hours	% inhibition*	0-72 hours	% inhibition*
Negative control	0.01	1.527	--	0.966	--
0.41 (0.35) [0.20] {0.17}	0.01	1.487	2.6	0.856	11.4
1.23 (1.05) [0.6] {0.51}	0.01	1.435	6.0	0.733	24.1
3.7 (3.45) [1.79] {1.67}	0.01	1.378	9.8	0.614	36.4
11.11 (10.71) [5.38] {5.19}	0.01	1.343	12.1	0.552	42.9
33.33 (32.18) [16.14] {15.58}	0.01	1.242	18.6	0.407	57.9
100 (94.02) [48.81] {45.52}	0.01	0.693	54.6	0.070	92.8
Reference chemical (3,5 dichlorophenol) ¹	0.01 ^a		Not calculated		Not calculated
Nominal concentrations (mg/L)					
Negative control		1.641		1.365	
0.56		1.581		1.138	
1.0		1.462		0.794	
1.8		0.845		0.117	
3.2		0.430		0.026	
5.6		0.362		0.020	
10		0.387		0.022	

*The % inhibition values relative to the negative control were calculated by the study author

¹The reference test was performed 26-29 January 2011

^aThe initial cell density used in the reference tests was not reported, but is presumably the same as in the definitive test.

Table 5: Statistical endpoint values.* (72-hour values calculated by the study author in terms of nominal formulation concentrations)

Statistical endpoint	Cell density	Growth rate	Yield
NOAEC (mg/L)	Not reported	<0.41	<0.41
LOAEC (mg/L)	Not reported	≤0.41	≤0.41
EC ₁₀ (mg/L) (95% C.I.)	Not reported	11.59 (6.24- to 6.88)	0.40 (0.14 to 0.78)
EC ₂₀ (mg/L) (95% C.I.)	Not reported	23.98 (16.34 to 31.02)	1.24 (0.60 to 2.04)
	Not reported	96.36 (76.10 to >100.0)	11.10 (7.81 to 16.09)

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EC ₅₀ (mg/L) (95% C.I.)			
Reference chemical (3,5 dichlorophenol) ¹	Not reported		
NOAEC		<0.56	<0.56
IC ₅₀ /EC ₅₀		2.27 (1.87 to 2.74)	1.04 (0.98 to 1.10)

* Do not use this table, if the study was deemed unacceptable.

¹The reference test was performed 26-29 January 2011

B. REPORTED STATISTICS:

The study author statistically analyzed the endpoints for growth rate and yield. All analyses were performed using ToxRat Professional statistical software. The data were assessed for normality and homogeneity of variance using Shapiro-Wilk's and Levene's tests, respectively. The growth data confirmed to be non-normally distributed and have homogeneous variances, and were analyzed using Williams Multiple Sequential t-test Procedure. The yield data were normally distributed and had homogeneous variances and were also analyzed using Williams Multiple Sequential t-test Procedure. ECx values were determined using probit analysis. All analyses were made using nominal formulation concentrations.

Data Evaluation Report on the Acute Toxicity of BAS 183 WB H (Dicamba acid) to Algae (*Pseudokirchneriella subcapitata*)

PMRA Submission Number {.....}

EPA MRID Number 48718009

C. VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: The reviewer statistically analyzed the endpoints for growth rate and yield using CETIS version 1.8.7.4 statistical software. All analyses were made using mean measured formulation concentrations. The toxicity values were also converted to mean measured active ingredient (dicamba) concentrations and reported in the Executive Summary, Results Synopsis, and Conclusions sections of this report. The data were confirmed to be normally distributed and have homogeneous variances using Shapiro-Wilk's and Bartlett's tests, respectively. Because the data followed a clear dose-response pattern, the NOAEC values were determined using William's multiple comparison tests. The ECx values were determined using nonlinear regression.

Growth rate

EC₀₅: 15.1 mg/L 95% C.I.: 9.85 to 19.4 mg/L

EC₅₀: 88.8 mg/L 95% C.I.: 81.4 to 97 mg/L

NOAEC: <0.35 mg/L

Probit Slope: N/A

Yield (of cell density)

EC₀₅: 0.825 mg/L 95% C.I.: N/A to 1.9 mg/L

EC₅₀: 14.9 mg/L 95% C.I.: 10.9 to 20.3 mg/L

NOAEC: <0.35 mg/L

Probit Slope: N/A

D. STUDY DEFICIENCIES:

There were no deviations and/or deficiencies from OCSPP guidance affecting the scientific soundness or acceptability of this study.

E. REVIEWER'S COMMENTS:

The reviewer's results differed slightly from those of the study author. The reviewer used mean measured concentrations to calculate the toxicity values, whereas the study author used nominal concentrations. The reviewer also used nonlinear regression to calculate the ECx values, whereas the study author used probit analysis. The reviewer's results are presented in the Executive Summary and Conclusions sections of this report.

The study author reported that the coefficient of variation of the mean specific growth rate replicates in the control was 1.0% and that the mean of the replicate coefficients of variation in the section-by-section growth rate was 14.4%, meeting the criteria of the OECD Guideline 201.

The in-life phase of the definitive test was conducted from 17-20 May 2011.

F. CONCLUSIONS:

This study is scientifically sound, but is classified as SUPPLEMENTAL for QUANTITATIVE USE because effects were observed at all test concentrations and a definitive NOAEC was not established. Also, the study duration was only 72 hours. After 72 hours, the most sensitive endpoint was yield, with NOAEC and EC50 values of <0.35 and 0.825 mg/L, respectively, in terms of mean measured formulation concentrations.

Data Evaluation Report on the Acute Toxicity of BAS 183 WB H (Dicamba acid) to Algae (*Pseudokirchneriella subcapitata*)

PMRA Submission Number {.....}

EPA MRID Number 48718009

Results in terms of mean measured formulation concentrations

Growth rate

EC₀₅: 15.1 mg/L 95% C.I.: 9.85 to 19.4 mg/L

EC₅₀: 88.8 mg/L 95% C.I.: 81.4 to 97 mg/L

NOAEC: <0.35 mg/L

Probit Slope: N/A

Yield (of cell density)

EC₀₅: 0.825 mg/L 95% C.I.: N/A to 1.9 mg/L

EC₅₀: 14.9 mg/L 95% C.I.: 10.9 to 20.3 mg/L

NOAEC: <0.35 mg/L

Probit Slope: N/A

Results in terms of mean measured active ingredient (dicamba) concentrations

Growth rate

EC₀₅: 7.27 mg ai/L 95% C.I.: 4.74 to 9.34 mg ai/L

EC₅₀: 42.75 mg ai/L 95% C.I.: 39.19 to 46.70 mg ai/L

NOAEC: <0.17 mg ai/L

Probit Slope: N/A

Yield (of cell density)

EC₀₅: 0.40 mg ai/L 95% C.I.: N/A to 0.91 mg ai/L

EC₅₀: 7.17 mg ai/L 95% C.I.: 5.25 to 9.77 mg ai/L

NOAEC: <0.17 mg ai/L

Probit Slope: N/A

Results in terms of mean measured acid equivalent concentrations

Growth rate

EC₀₅: 7.10 mg ae /L 95% C.I.: 4.63 to 9.13 mg ae /L

EC₅₀: 41.77 mg ae /L 95% C.I.: 38.29 to 45.63 mg ae /L

NOAEC: <0.17 mg ae /L

Probit Slope: N/A

Yield (of cell density)

EC₀₅: 0.39mg ae/L 95% C.I.: N/A to 0.90 mg ae /L

EC₅₀: 7.01 mg ae /L 95% C.I.: 5.12 to 9.54 mg ae /L

NOAEC: <0.17 mg ae /L

Probit Slope: N/A

Endpoint(s) Effected: Growth rate and yield

III. REFERENCES:

[1] OECD Guideline for Testing of Chemicals No 201 (2006): "Freshwater Alga and Cyanobacteria, Growth Inhibition Test".

Data Evaluation Report on the Acute Toxicity of BAS 183 WB H (Dicamba acid) to Algae (*Pseudokirchneriella subcapitata*)

PMRA Submission Number {.....}

EPA MRID Number 48718009

[2] Directive 2004/11/EC on the harmonisation of laws, regulations and administrative provisions relating to the application of the principles of good laboratory practice and the verification of their applications for tests on chemical substances (codified version).

[3] Torsten Kallqvist, Norwegian Institute For Water Research 'Testing of "new" species for revision of OECD TG 201 - Algae Growth Inhibition Test' Oslo 26 November 1999.

[4] ToxRat Professional 2.10 - Software for Statistical Evaluation of Biotests III Ecotoxicology, ToxRat Solutions GmbH, Alsdorf, Germany.

[5] Polish legalization: Rozp. Min. Zdrowia z dn. 04. 06.2003 r., Dz.U. Nr 116, Poz. 1103.
RozporzC}-dzenie Min. Zdrowia z dn. 28.05.2010, Dz. U. No. 109, p. 722.

APPENDIX I. MEAN MEASURED CONCENTRATION CALCULATIONS IN MICROSOFT EXCEL

Concentrations in mg/L

Nominal formulation concentration	Nominal ai concentration	0 h measured ai concentration	72 h measured ai concentration	Mean measured ai concentration	Mean measured formulation concentration
0.41	0.2	0.18	0.16	0.17	0.35
1.23	0.6	0.54	0.48	0.51	1.05
3.7	1.79	1.69	1.65	1.67	3.45
11.11	5.38	5.04	5.33	5.19	10.71
33.33	16.14	15.3	15.86	15.58	32.18
100	48.41	45.58	45.45	45.52	94.02

APPENDIX II. CALCULATION OF % INHIBITION OF CELL DENSITY IN MICROSOFT EXCEL

Nominal formulation concentration	Mean cell density (72 h)	% Inhibition
0	0.976	0.0%
0.41	0.866	11.3%
1.23	0.743	23.9%
3.7	0.624	36.1%
11.11	0.562	42.4%
33.33	0.417	57.3%

**Data Evaluation Report on the Acute Toxicity of BAS 183 WB H (Dicamba acid) to Algae
(*Pseudokirchneriella subcapitata*)**

PMRA Submission Number {.....}

EPA MRID Number 48718009

100	0.08	91.8%
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CETIS Summary Report

Report Date: 24 Jan-13 15:51 (p 1 of 2)
 Test Code: 02801 48718009 | 04-7196-8010

BASF

OCSPP 850.4500 Algal Toxicity

Batch ID: 15-1946-0198
 Start Date: 17 May-11
 Ending Date: 20 May-11
 Duration: 72h
 Sample ID: 11-1764-6976
 Sample: 17 May-11
 Receive Date: 20 May-11
 Sample Age: NA
 Test Type: Algal Cell Growth (96-h)
 Protocol: OCSPP 850.4500 Aquatic Plant (Algae)
 Species: Pseudokirchneriella subcapitata
 Source: Lab In-House Culture
 Code: 48718009
 Material: Dicamba acid (#1918-00-9)
 Source: BASF Corporation
 Station:

Analyst:
 Diluent: Algal Culture Media
 Brine:
 Age: 4d
 Client: CDM Smith
 Project: Unknown

Batch Note: 029801 48718009 BAS 183 WB H
 Sample: 029801 48718009 BAS 183 WB H

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
13-8518-5455	72h Cell Density	<0.35	0.35	NA	8.42%		Dunnett Multiple Comparison Test
16-1000-0698	72h Cell Density	<0.35	0.35	NA	6.1%		Williams Multiple Comparison Test
02-4165-4850	72h Growth Rate	<0.35	0.35	NA	2.56%		Dunnett Multiple Comparison Test
08-8915-7985	72h Growth Rate	<0.35	0.35	NA	1.86%		Williams Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg ai/L	95% LCL	95% UCL	TU	Method
10-7731-7758	72h Cell Density	IC5	0.825	N/A	1.9		Nonlinear Regression
		IC10	1.56	0.452	2.91		
		IC25	4.54	2.57	7.23		
		IC50	14.9	10.9	20.3		
05-2849-3080	72h Growth Rate	IC5	15.1	9.85	19.4		Nonlinear Regression
		IC10	22.3	16.9	27.4		
		IC25	42.9	37.4	48.7		
		IC50	88.8	81.4	97		

72h Cell Density Summary

C-mg ai/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative	6	0.966	0.917	1.02	0.921	1.05	0.0191	0.0469	4.85%	0.0%
0.35		3	0.856	0.729	0.983	0.821	0.915	0.0295	0.0512	5.97%	11.4%
1.05		3	0.733	0.555	0.911	0.688	0.816	0.0414	0.0717	9.78%	24.1%
3.45		3	0.614	0.519	0.71	0.577	0.654	0.0223	0.0386	6.28%	36.4%
10.71		3	0.552	0.468	0.636	0.513	0.572	0.0195	0.0338	6.12%	42.9%
32.18		3	0.407	0.315	0.498	0.377	0.448	0.0213	0.0369	9.08%	57.9%
94.02		3	0.07	0.0592	0.0808	0.067	0.075	0.00252	0.00436	6.23%	92.8%

72h Growth Rate Summary

C-mg ai/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative	6	1.53	1.51	1.54	1.51	1.55	0.00643	0.0157	1.03%	0.0%
0.35		3	1.49	1.44	1.54	1.47	1.51	0.0113	0.0195	1.31%	2.62%
1.05		3	1.43	1.36	1.51	1.41	1.47	0.018	0.0312	2.18%	6.0%
3.45		3	1.38	1.33	1.43	1.36	1.4	0.0121	0.021	1.52%	9.76%
10.71		3	1.34	1.29	1.39	1.32	1.36	0.0118	0.0205	1.53%	12.1%
32.18		3	1.24	1.17	1.31	1.22	1.27	0.0167	0.029	2.33%	18.6%
94.02		3	0.693	0.648	0.737	0.68	0.713	0.0103	0.0178	2.57%	54.6%

CETIS Summary Report

Report Date: 24 Jan-13 15:51 (p 2 of 2)
Test Code: 02801 48718009 | 04-7196-8010
BASF

OCSPP 850.4500 Algal Toxicity

72h Cell Density Detail

C-mg ai/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Negative	0.994	0.953	0.937	0.945	1.05	0.921
0.35		0.833	0.821	0.915			
1.05		0.816	0.696	0.688			
3.45		0.577	0.612	0.654			
10.71		0.513	0.572	0.571			
32.18		0.395	0.377	0.448			
94.02		0.068	0.075	0.067			

72h Growth Rate Detail

C-mg ai/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Negative	1.54	1.52	1.52	1.52	1.55	1.51
0.35		1.48	1.47	1.51			
1.05		1.47	1.42	1.41			
3.45		1.36	1.38	1.4			
10.71		1.32	1.36	1.35			
32.18		1.23	1.22	1.27			
94.02		0.685	0.713	0.68			

CETIS Analytical Report

Report Date: 24 Jan-13 15:50 (p 1 of 4)
Test Code: 02801 48718009 | 04-7196-8010

OCSPP 850.4500 Algal Toxicity

BASF

Analysis ID: 13-8518-5455
Analyzed: 24 Jan-13 15:37
Batch ID: 15-1946-0198
Start Date: 17 May-11
Ending Date: 20 May-11
Duration: 72h
Endpoint: 72h Cell Density
Analysis: Parametric-Control vs Treatments
Test Type: Algal Cell Growth (96-h)
Protocol: OCSPP 850.4500 Aquatic Plant (Algae)
Species: Pseudokirchneriella subcapitata
Source: Lab In-House Culture

CETIS Version: CETISv1.8.7
Official Results: Yes
Analyst:
Diluent: Algal Culture Media
Brine:
Age: 4d

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	8.42%	<0.35	0.35	NA	

Dunnett Multiple Comparison Test

Control	vs	C-mg ai/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		0.35*	3.45	2.55	0.081	7	0.0081	CDF	Significant Effect
		1.05*	7.31	2.55	0.081	7	<0.0001	CDF	Significant Effect
		3.45*	11	2.55	0.081	7	<0.0001	CDF	Significant Effect
		10.71*	13	2.55	0.081	7	<0.0001	CDF	Significant Effect
		32.18*	17.6	2.55	0.081	7	<0.0001	CDF	Significant Effect
		94.02*	28.1	2.55	0.081	7	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.967965	0.3279942	6	162	<0.0001	Significant Effect
Error	0.034518	2.030471E-03	17			
Total	2.002483		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.8	16.8	0.2533	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.906	0.884	0.0295	Normal Distribution

72h Cell Density Summary

C-mg ai/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative	6	0.966	0.917	1.02	0.949	0.921	1.05	0.0191	4.85%	0.0%
0.35		3	0.856	0.729	0.983	0.833	0.821	0.915	0.0295	5.97%	11.4%
1.05		3	0.733	0.555	0.911	0.696	0.688	0.816	0.0414	9.78%	24.1%
3.45		3	0.614	0.519	0.71	0.612	0.577	0.654	0.0223	6.28%	36.4%
10.71		3	0.552	0.468	0.636	0.571	0.513	0.572	0.0195	6.12%	42.9%
32.18		3	0.407	0.315	0.498	0.395	0.377	0.448	0.0213	9.08%	57.9%
94.02		3	0.07	0.0592	0.0808	0.068	0.067	0.075	0.00252	6.23%	92.8%

Graphics

CETIS Analytical Report

Report Date: 24 Jan-13 15:50 (p 2 of 4)
Test Code: 02801 48718009 | 04-7196-8010

BASF

OCSPP 850.4500 Algal Toxicity

Analysis ID: 16-1000-0698
Analyzed: 24 Jan-13 15:40
Batch ID: 15-1946-0198
Start Date: 17 May-11
Ending Date: 20 May-11
Duration: 72h
Endpoint: 72h Cell Density
Analysis: Parametric-Control vs Ord.Treatments
Test Type: Algal Cell Growth (96-h)
Protocol: OCSPP 850.4500 Aquatic Plant (Algae)
Species: Pseudokirchneriella subcapitata
Source: Lab In-House Culture

CETIS Version: CETISv1.8.7
Official Results: Yes
Analyst:
Diluent: Algal Culture Media
Brine:
Age: 4d

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	6.1%	<0.35	0.35	NA	

Williams Multiple Comparison Test

Control	vs	C-mg ai/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		0.35*	3.45	1.74	0.055	7	<0.05	CDF	Significant Effect
		1.05*	7.31	1.81	0.057	7	<0.05	CDF	Significant Effect
		3.45*	11	1.83	0.058	7	<0.05	CDF	Significant Effect
		10.71*	13	1.84	0.058	7	<0.05	CDF	Significant Effect
		32.18*	17.6	1.85	0.058	7	<0.05	CDF	Significant Effect
		94.02*	28.1	1.85	0.058	7	<0.05	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.967965	0.3279942	6	162	<0.0001	Significant Effect
Error	0.034518	2.030471E-03	17			
Total	2.002483		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.8	16.8	0.2533	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.906	0.884	0.0295	Normal Distribution

72h Cell Density Summary

C-mg ai/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative	6	0.966	0.917	1.02	0.949	0.921	1.05	0.0191	4.85%	0.0%
0.35		3	0.856	0.729	0.983	0.833	0.821	0.915	0.0295	5.97%	11.4%
1.05		3	0.733	0.555	0.911	0.696	0.688	0.816	0.0414	9.78%	24.1%
3.45		3	0.614	0.519	0.71	0.612	0.577	0.654	0.0223	6.28%	36.4%
10.71		3	0.552	0.468	0.636	0.571	0.513	0.572	0.0195	6.12%	42.9%
32.18		3	0.407	0.315	0.498	0.395	0.377	0.448	0.0213	9.08%	57.9%
94.02		3	0.07	0.0592	0.0808	0.068	0.067	0.075	0.00252	6.23%	92.8%

Graphics

CETIS Analytical Report

Report Date: 24 Jan-13 15:50 (p 3 of 4)
Test Code: 02801 48718009 | 04-7196-8010
BASF

OCSPP 850.4500 Algal Toxicity

Analysis ID:	02-4165-4850	Endpoint:	72h Growth Rate	CETIS Version:	CETISv1.8.7
Analyzed:	24 Jan-13 15:37	Analysis:	Parametric-Control vs Treatments	Official Results:	Yes
Batch ID:	15-1946-0198	Test Type:	Algal Cell Growth (96-h)	Analyst:	
Start Date:	17 May-11	Protocol:	OCSPP 850.4500 Aquatic Plant (Algae)	Diluent:	Algal Culture Media
Ending Date:	20 May-11	Species:	Pseudokirchneriella subcapitata	Brine:	
Duration:	72h	Source:	Lab In-House Culture	Age:	4d

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	2.56%	<0.35	0.35	NA	

Dunnett Multiple Comparison Test

Control	vs	C-mg ai/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		0.35*	2.61	2.55	0.039	7	0.0449	CDF	Significant Effect
		1.05*	5.98	2.55	0.039	7	<0.0001	CDF	Significant Effect
		3.45*	9.72	2.55	0.039	7	<0.0001	CDF	Significant Effect
		10.71*	12	2.55	0.039	7	<0.0001	CDF	Significant Effect
		32.18*	18.5	2.55	0.039	7	<0.0001	CDF	Significant Effect
		94.02*	54.4	2.55	0.039	7	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.587503	0.2645838	6	563	<0.0001	Significant Effect
Error	7.988662E-03	4.699213E-04	17			
Total	1.595491		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.82	16.8	0.9355	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.912	0.884	0.0400	Normal Distribution

72h Growth Rate Summary

C-mg ai/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative	6	1.53	1.51	1.54	1.52	1.51	1.55	0.00643	1.03%	0.0%
0.35		3	1.49	1.44	1.54	1.48	1.47	1.51	0.0113	1.31%	2.62%
1.05		3	1.43	1.36	1.51	1.42	1.41	1.47	0.018	2.18%	6.0%
3.45		3	1.38	1.33	1.43	1.38	1.36	1.4	0.0121	1.52%	9.76%
10.71		3	1.34	1.29	1.39	1.35	1.32	1.36	0.0118	1.53%	12.1%
32.18		3	1.24	1.17	1.31	1.23	1.22	1.27	0.0167	2.33%	18.6%
94.02		3	0.693	0.648	0.737	0.685	0.68	0.713	0.0103	2.57%	54.6%

Graphics

CETIS Analytical Report

Report Date: 24 Jan-13 15:50 (p 4 of 4)
 Test Code: 02801 48718009 | 04-7196-8010

BASF

OCSPP 850.4500 Algal Toxicity

Analysis ID: 08-8915-7985
Analyzed: 24 Jan-13 15:40
Batch ID: 15-1946-0198
Start Date: 17 May-11
Ending Date: 20 May-11
Duration: 72h
Endpoint: 72h Growth Rate
Analysis: Parametric-Control vs Ord.Treatments
Test Type: Algal Cell Growth (96-h)
Protocol: OCSPP 850.4500 Aquatic Plant (Algae)
Species: Pseudokirchneriella subcapitata
Source: Lab In-House Culture

CETIS Version: CETISv1.8.7
Official Results: Yes
Analyst:
Diluent: Algal Culture Media
Brine:
Age: 4d

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	1.86%	<0.35	0.35	NA	

Williams Multiple Comparison Test

Control	vs	C-mg ai/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		0.35*	2.61	1.74	0.026	7	<0.05	CDF	Significant Effect
		1.05*	5.98	1.81	0.027	7	<0.05	CDF	Significant Effect
		3.45*	9.72	1.83	0.028	7	<0.05	CDF	Significant Effect
		10.71*	12	1.84	0.028	7	<0.05	CDF	Significant Effect
		32.18*	18.5	1.85	0.028	7	<0.05	CDF	Significant Effect
		94.02*	54.4	1.85	0.028	7	<0.05	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.587503	0.2645838	6	563	<0.0001	Significant Effect
Error	7.988662E-03	4.699213E-04	17			
Total	1.595491		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.82	16.8	0.9355	Equal Variances
Variances	Mod Levene Equality of Variance	0.399	5.07	0.8646	Equal Variances
Variances	Levene Equality of Variance	0.812	4.1	0.5750	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.912	0.884	0.0400	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.182	0.206	0.0383	Normal Distribution
Distribution	D'Agostino Skewness	1.21	2.58	0.2272	Normal Distribution
Distribution	D'Agostino Kurtosis	1.45	2.58	0.1466	Normal Distribution
Distribution	D'Agostino-Pearson K2	3.57	9.21	0.1682	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.894	3.88	0.0224	Normal Distribution

72h Growth Rate Summary

C-mg ai/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative	6	1.53	1.51	1.54	1.52	1.51	1.55	0.00643	1.03%	0.0%
0.35		3	1.49	1.44	1.54	1.48	1.47	1.51	0.0113	1.31%	2.62%
1.05		3	1.43	1.36	1.51	1.42	1.41	1.47	0.018	2.18%	6.0%
3.45		3	1.38	1.33	1.43	1.38	1.36	1.4	0.0121	1.52%	9.76%
10.71		3	1.34	1.29	1.39	1.35	1.32	1.36	0.0118	1.53%	12.1%
32.18		3	1.24	1.17	1.31	1.23	1.22	1.27	0.0167	2.33%	18.6%
94.02		3	0.693	0.648	0.737	0.685	0.68	0.713	0.0103	2.57%	54.6%

CETIS Analytical Report

Report Date: 24 Jan-13 15:50 (p 5 of 4)
Test Code: 02801 48718009 | 04-7196-8010
BASF

OCSPP 850.4500 Algal Toxicity

Analysis ID: 08-8915-7985 Endpoint: 72h Growth Rate
Analyzed: 24 Jan-13 15:40 Analysis: Parametric-Control vs Ord.Treatments
Graphics

CETIS Version: CETISv1.8.7
Official Results: Yes